

Texas Probable Maximum Precipitation (PMP)

GIS Service - User Guide

The PMP GIS tool is a geoprocessing service hosted by the TCEQ.

This tool calculates gridded PMP depths for a given drainage basin for the specified durations for general, local, and tropical storm types. PMP values are calculated (in inches) for each grid point (spaced at 90 arc-second intervals) within (or adjacent to) the drainage basin. A Basin Average table is created over the basin using the grid point PMP values.

This tool will have a max processing load of 6 instances at a single time. This is to ensure efficient processing time and capacity.

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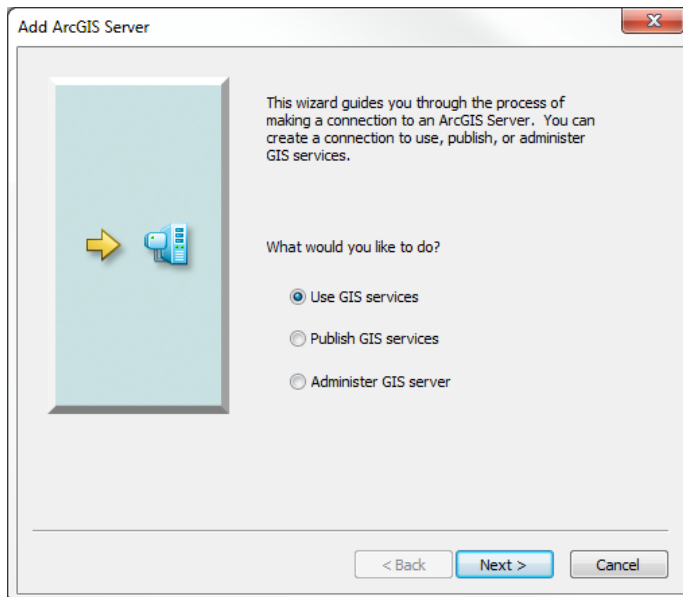
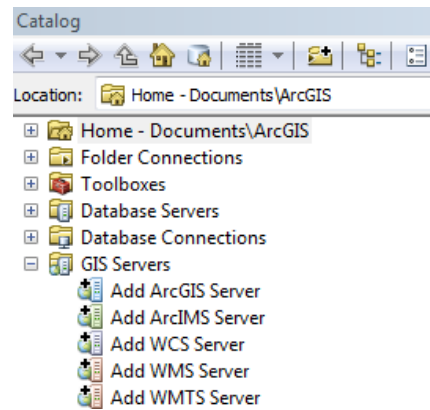
[TCEQ Gridded PMP Tool Explained](#)

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Adding Tool Connection

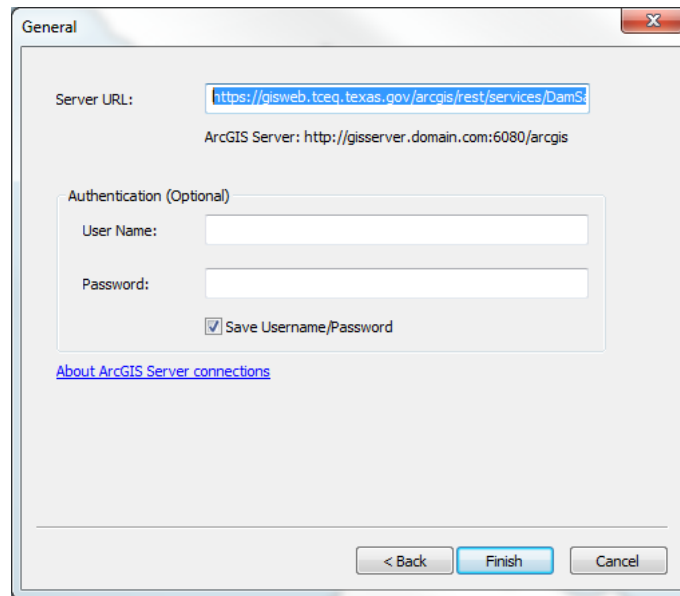
Within **ArcMap**, open **ArcCatalog**. Navigate to the **GIS Servers** folder and double click **Add ArcGIS Server**.



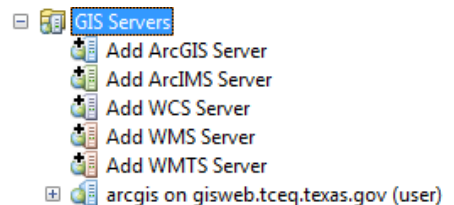
Accept the default of **Use GIS services** and click the **Next >** button.

Enter the following link into the **Server URL**, replacing the existing http://

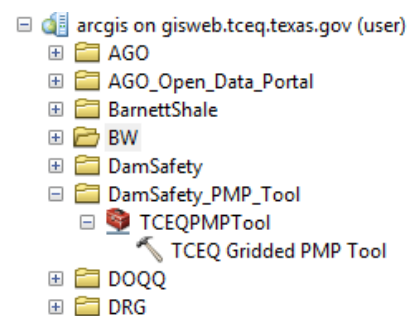
https://gisweb.tceq.texas.gov/arcgis/rest/services/DamSafety_PMP_Tool/TCEQPMPTool/GPServer

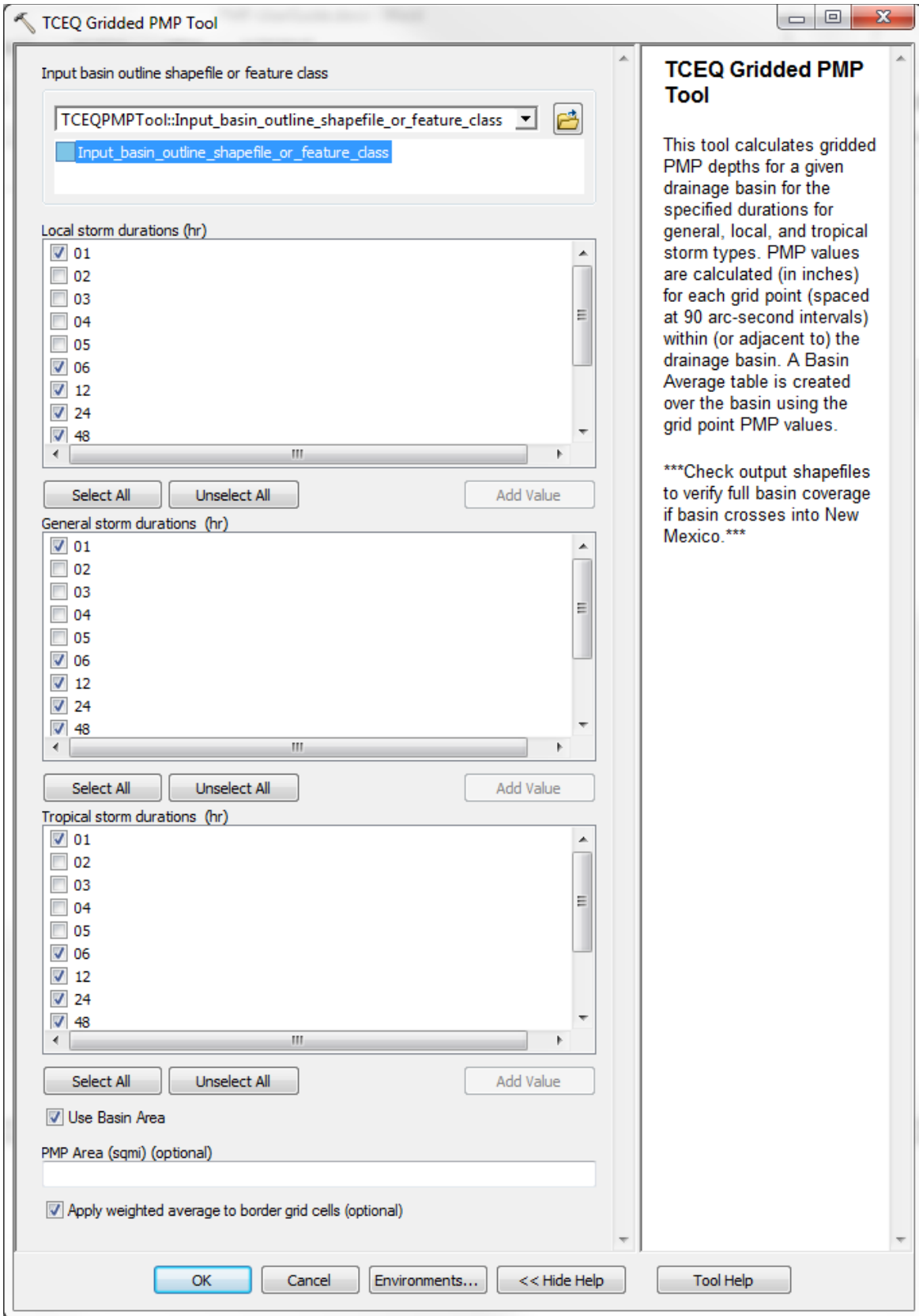


Press Finish. There should now be a new link within the **GIS Servers** folder labeled **gisweb.tceq.texas.gov**



Navigate to the **DamSafety_PMP_Tool** folder and open the **TCEQPMPTool** toolbox. Open the **TCEQ Gridded PMP Tool**.





Input basin outline shapefile or feature class

TCEQPMPTool::Input_basin_outline_shapefile_or_feature_class

Input_basin_outline_shapefile_or_feature_class

Local storm durations (hr)

- 01
- 02
- 03
- 04
- 05
- 06
- 12
- 24
- 48

Select All

Unselect All

Add Value

General storm durations (hr)

- 01
- 02
- 03
- 04
- 05
- 06
- 12
- 24
- 48

Select All

Unselect All

Add Value

Tropical storm durations (hr)

- 01
- 02
- 03
- 04
- 05
- 06
- 12
- 24
- 48

Select All

Unselect All

Add Value

Use Basin Area

PMP Area (sqmi) (optional)

Apply weighted average to border grid cells (optional)

OK

Cancel

Environments...

<< Hide Help

Tool Help

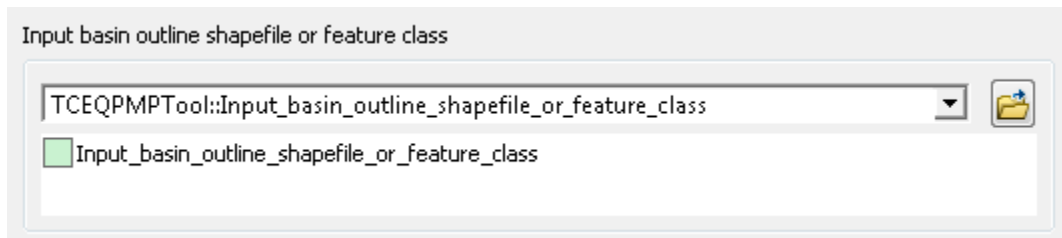
TCEQ Gridded PMP Tool

This tool calculates gridded PMP depths for a given drainage basin for the specified durations for general, local, and tropical storm types. PMP values are calculated (in inches) for each grid point (spaced at 90 arc-second intervals) within (or adjacent to) the drainage basin. A Basin Average table is created over the basin using the grid point PMP values.

Check output shapefiles to verify full basin coverage if basin crosses into New Mexico.

TCEQ Gridded PMP Tool Explained

Input basin



There are several different methods of input for this field.

1. Choosing an existing layer within the Map by clicking the drop-down
2. Choosing a layer within a folder by clicking the Browse button
3. Drawing a polygon directly on the Map after opening the tool

The input basin should be a projected polygon shapefile or feature class. If it is split into sub-basins, utilize the Dissolve tool (Data Management) to create a new shapefile of the full basin. If the layer contains multiple basins, use the select tool to highlight a **single** basin. **The tool will only process one item at a time.**

Storm Types and Durations

Each storm type (Local, General and Tropical) requires durations to be selected. The durations, in hours, require **at least one selection per storm type**. All storms have the following durations: 1, 2, 3, 4, 5, 6, 12, 24, 48, 72, 96, and 120.

Local storm durations (hr)

<input checked="" type="checkbox"/>	01
<input type="checkbox"/>	02
<input type="checkbox"/>	03
<input type="checkbox"/>	04
<input type="checkbox"/>	05
<input checked="" type="checkbox"/>	06
<input checked="" type="checkbox"/>	12
<input checked="" type="checkbox"/>	24
<input checked="" type="checkbox"/>	48

General storm durations (hr)

<input checked="" type="checkbox"/>	01
<input type="checkbox"/>	02
<input type="checkbox"/>	03
<input type="checkbox"/>	04
<input type="checkbox"/>	05
<input checked="" type="checkbox"/>	06
<input checked="" type="checkbox"/>	12
<input checked="" type="checkbox"/>	24
<input checked="" type="checkbox"/>	48

Tropical storm durations (hr)

<input checked="" type="checkbox"/>	01
<input type="checkbox"/>	02
<input type="checkbox"/>	03
<input type="checkbox"/>	04
<input type="checkbox"/>	05
<input checked="" type="checkbox"/>	06
<input checked="" type="checkbox"/>	12
<input checked="" type="checkbox"/>	24
<input checked="" type="checkbox"/>	48

Use Basin Area / PMP Area

Use Basin Area

PMP Area (sqmi) (optional)

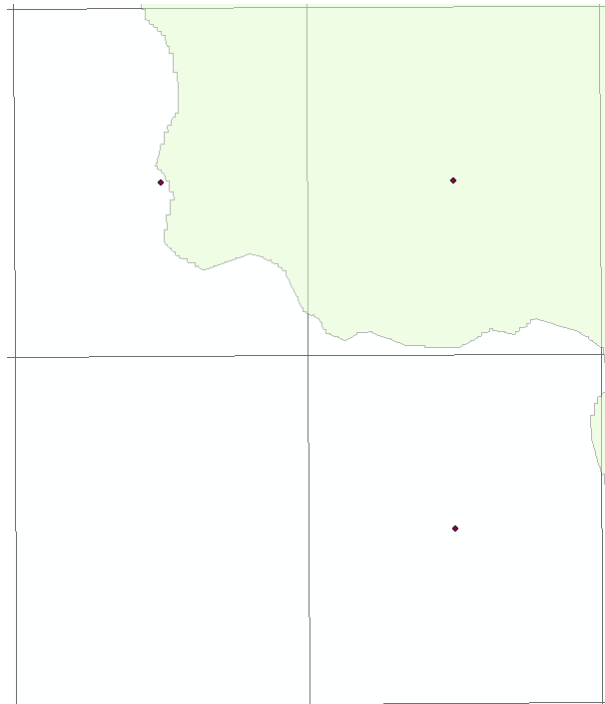
Use Basin Area is the default and should always be checked, unless processing sub-basins. When processing sub-basins, the **Use Basin Area** is unchecked and a value must be entered in the **PMP Area** field. These steps are outlined [below](#).

Apply Weighted Average

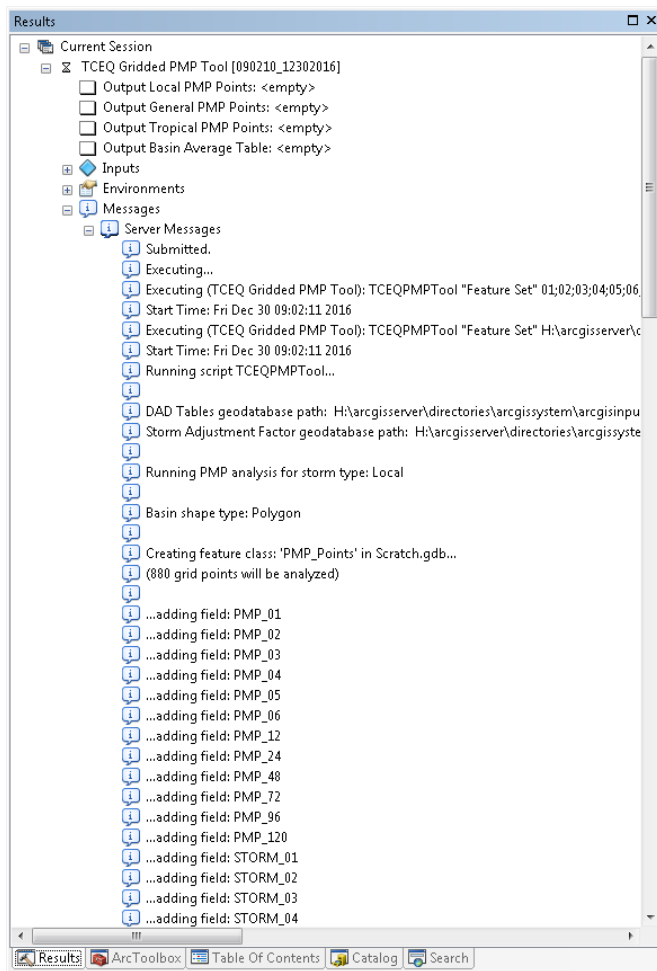
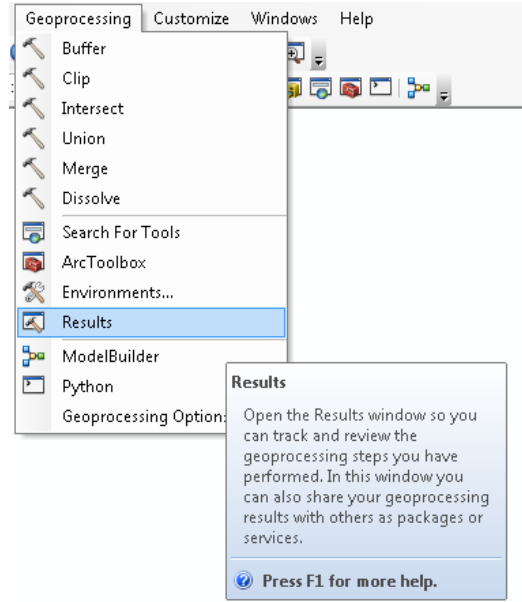
Apply weighted average to border grid cells (optional)

The **Apply weighted average to border grid cells** takes the percent of the Basin covering each cell and adjusts the value.

For instance, in the example to the right, instead of taking the full value of all three cells shown, this option only applies the percent of the covered areas. So the cell that only has a fraction covered will not be over-valued.



Once all the options are selected, and the tool is running, the only way to ensure processing is to open the **Results** window under the **Geoprocessing** tab.



Once the **Results** window is open, the tool will show under the **Current Session** section. There are several different symbols that could show next to the tool.

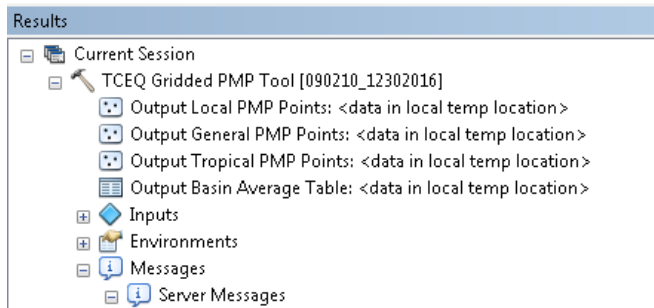
■ A cancelled tool

⌚ A tool that is currently processing

🔧 A tool that has been completed

⌚ A tool in queue. Depending on processing volume, this could take some time to run.

❌ A tool that has error and did not process.

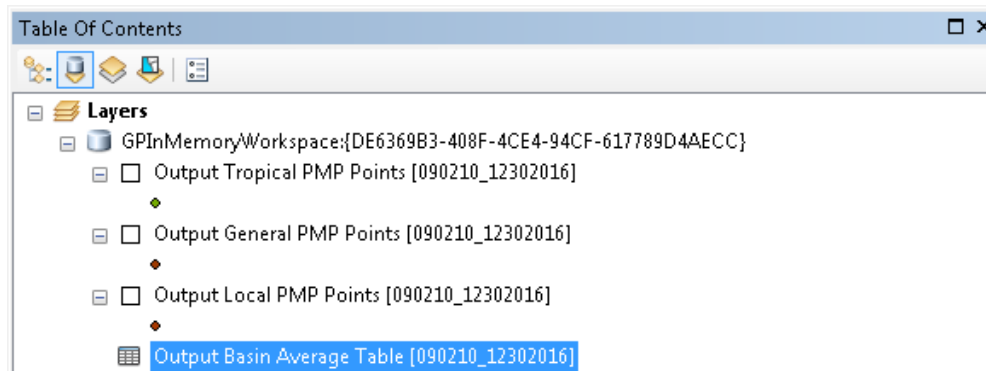


Once the tool has finished processing, the results tab will identify that the data is located in a local temp location.

Navigate to the Table of Contents to view and export data to a permanent location.

Outputs

One table and three shapefiles are the outputs of this tool.

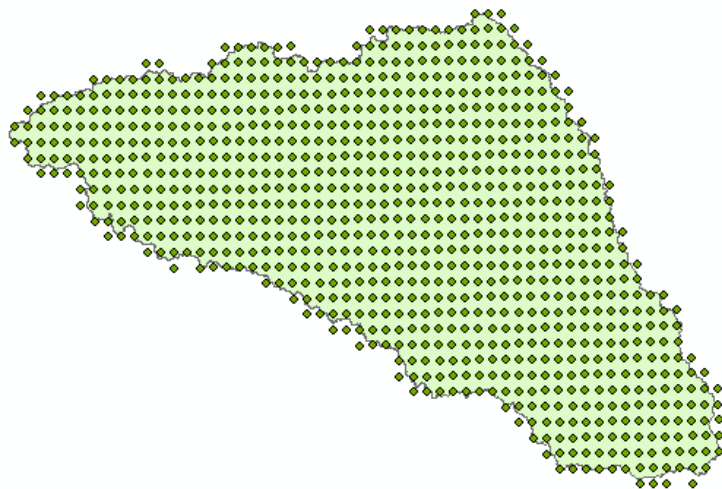


The Basin Average Table is the main output for this tool. It contains the PMP values for each storm type and duration. Choose the duration value that makes the most sense for your study. Usually this would be the most conservative value.

OID	STORM_TYPE	PMP_01	PMP_02	PMP_03	PMP_04	PMP_05	PMP_06	PMP_12	PMP_24	PMP_48	PMP_72	PMP_96	PMP_120
1	Local	3.2	6.15	9.23	9.95	10.56	11.16	13.97	23.04	28.49	28.54	28.54	28.54
2	General	3.33	4.76	5.82	7.25	8.59	10.01	14.87	18.5	24.6	28.47	29.62	29.65
3	Tropical	2.99	5.97	8.96	9.66	10.25	10.84	14.73	23.69	29.29	29.39	29.39	29.39

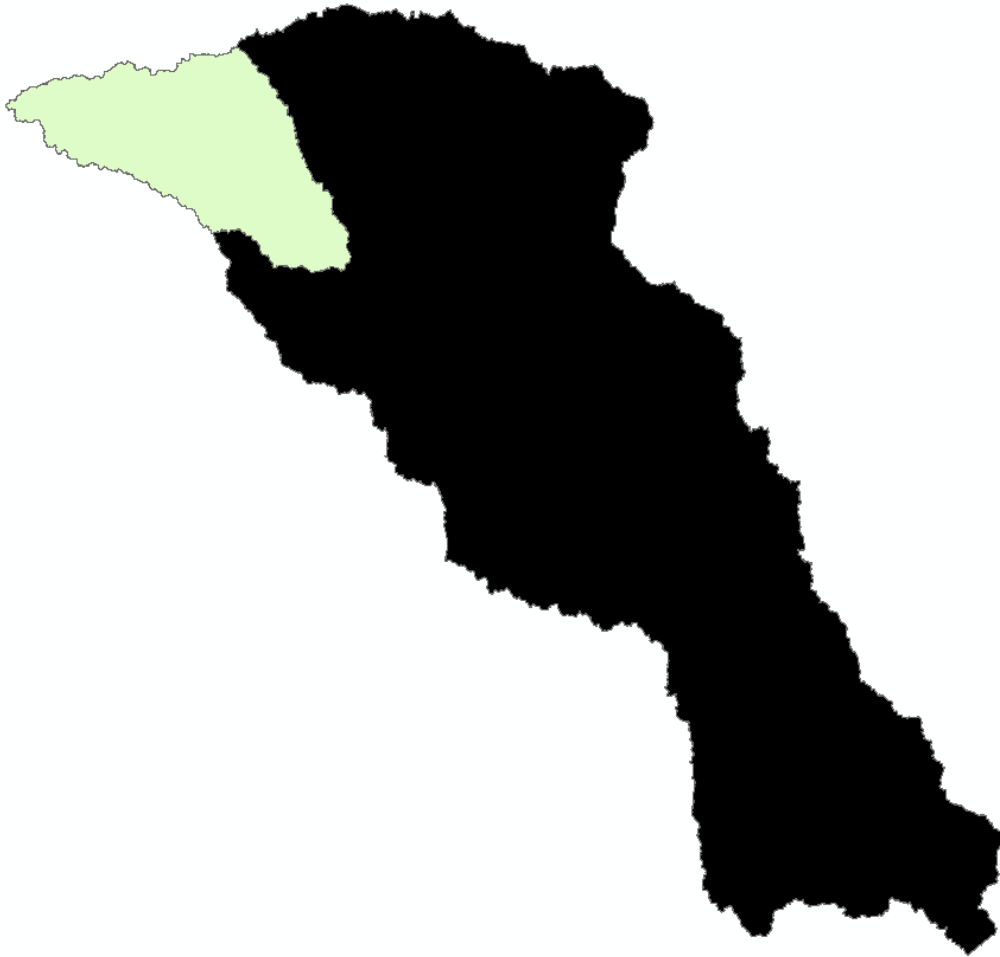
There is no need to use HMR52 to obtain values. This tool provides the only values you need. Please see the PMP Study Documentation for further reference.

The shapefiles, correlating to each storm type, contain points representing the grid cells intersecting the basin. Each row in their attribute table contains the lat/long, elevation, zone, and PMP values for each duration with their corresponding storms. See the attribute table below for reference.



***If the input basin crosses into New Mexico, check the output shapefiles to verify full basin coverage. The study area does not fully extend into New Mexico. ***

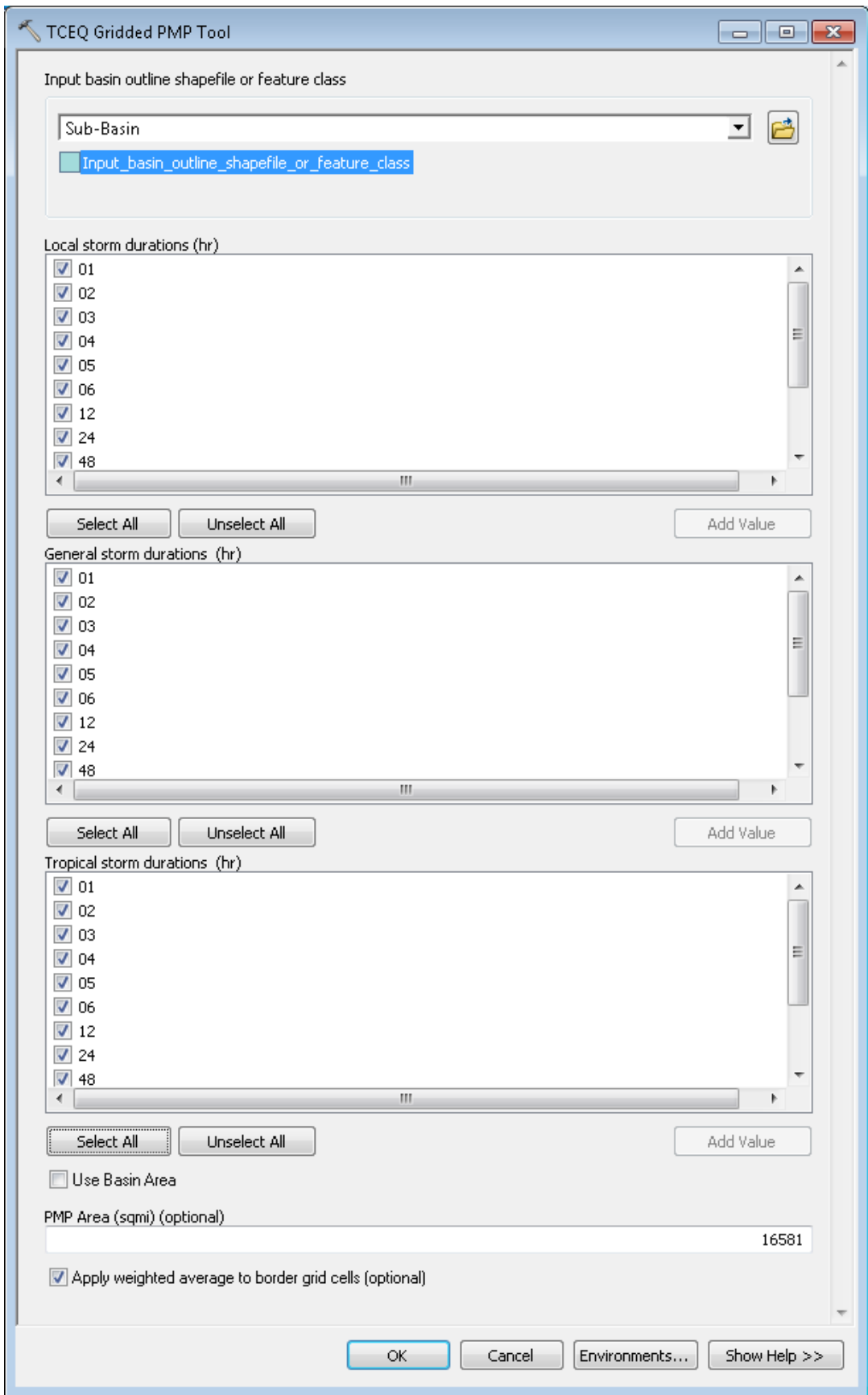
Processing sub-basins



To process a sub-basin (shown in green), the Area in square miles of the original basin (shown in black) is needed. For this example, the Total Basin Area is 16,581 sqmi.

After opening the tool, select the sub-basin as the input. If all sub-basins are within a single shapefile, use the select tool and highlight a **single** sub-basin before processing. Select the storm durations, then scroll down to the **Use Basin Area** field and **uncheck** the box. In the **PMP Area** field, enter the total area for the original basin, 16,581.

See the below for reference.



Notice in the tables below the difference in processing an area as a sub-basin versus a stand-alone basin.

Area processed as sub-basin

OID	STORM_TYPE	PMP_01	PMP_02	PMP_03	PMP_04	PMP_05	PMP_06	PMP_12	PMP_24	PMP_48	PMP_72	PMP_96	PMP_120
1	Local	1.15	2.23	3.26	3.54	3.79	4.09	5.07	7.36	10.76	11.35	11.45	11.72
2	General	1.74	2.5	3.03	3.56	3.98	4.28	7.96	13.12	16.09	16.48	17.52	18.07
3	Tropical	1.12	2.16	3.19	3.44	3.68	3.99	5.67	8.35	12.73	13.07	14.67	15.33

Compared to the sub-basin being run as its own basin...below

OID	STORM_TYPE	PMP_01	PMP_02	PMP_03	PMP_04	PMP_05	PMP_06	PMP_12	PMP_24	PMP_48	PMP_72	PMP_96	PMP_120
1	Local	3.2	6.15	9.23	9.95	10.56	11.16	13.97	23.04	26.49	26.54	26.54	26.54
2	General	3.33	4.76	5.82	7.25	8.59	10.01	14.87	18.5	24.6	28.47	29.62	29.65
3	Tropical	2.99	5.97	8.96	9.66	10.25	10.84	14.73	23.69	29.29	29.39	29.39	29.39

For any questions or troubleshooting, please contact: DamsInfo@tceq.texas.gov